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also cannibalistic habits. A toad has been observed to breakfast upon nine wasps, and dine upon eight more. It does not swallow bees and wasps immediately, but first presses them to death between its jaws, and thus avoids their sting. Insects and snails form, however, the principal food of the amphibians of the State, as well as of the lizards and smaller turtles. The danger from venomous snakes is much exaggerated, as out of the few bitten three out of four get well. This department is less valuable than the others on account of the author's manifest unacquaintance with the nature of the higher systematic analysis. The only valuable statements in this field are copied from other authors without credit. This is especially true of the Urodela, although the author states that "the classification and description" is taken "from the author's printed thesis" on this subject.

Dr. Jordan enumerates 163 species of fishes, of which forty may be considered characteristic of the lake fauna, and sixty-seven of that of the Ohio, while the remainder are common to both. This portion of the report is in every respect up to date, containing the results of the writer's own researches as well as those of other workers, and is rendered interesting by accounts of the habits of such fish as are valued by sportsmen, culled from the various sporting papers.

The entire report is much disfigured by typographical errors. Jordan is repeatedly written Jordon, *rugchos* and *rhugchos* are specimens of compositors' Greek for a snout, Lophophanes does duty for Lophophanes, sagittale sports an extra g, and so on.

KING'S ECONOMIC RELATIONS OF WISCONSIN BIRDS.—This essay forms chapter XI of the report of Professor T. C. Chamberlain, State Geologist of Wisconsin, and has been prepared by Mr. F. H. King, assistant on the Survey. It comprises 269 pages of the report and is thus rather a voluminous contribution to a subject which is attracting much attention in this country, and which is one of much practical as well as biological interest. Now that our birds are described and the systematist's work is about completed, their life-histories, habits and relations to their environments are subjects still fresh and novel, and much remains to be done towards harmonizing the discordant views held as to the value of birds as insect-destroyers. The materials for the facts recorded by Mr. King were obtained from an examination of the contents of the stomachs of over 1800 birds, 1608 of which contributed results which have been incorporated in this report. From the 1608 stomachs examined the *dissecta membra* of 7663 insects were obtained. Part of his work was done in Jefferson county, Wis., and part at Ithaca, N. Y.

Mr. King estimates, from of course imperfect data, the bird population of Jefferson county at sixty-six per square mile and that of Ithaca at one hundred and fourteen per square mile. "This would give for Jefferson county a total bird population of

30,096, and for an equal area in the vicinity of Ithaca, 51,984. At the rate of sixty-six per square mile, an area somewhat less than that of our State (Wisconsin) would have a population of 3,565,000." He then, after stating some facts, concludes: "Fifty insects of the average size would certainly be a small daily allowance for the average bird. One hundred and twenty days is less than the time our summer residents are with us. At the rate assumed, each bird would consume 6000 insects. This would give as the aggregate number of insects consumed by the birds calculated to occupy an area equal to that of our State, the enormous total of 21,384,000,000. Add to this amount the work which these birds do in their Southern homes, and we have a low estimate of the influence they exert over insect life." After discussing a number of topics, the author devotes the body of the essay to an account, original and compiled, of the insectivorous habits of 295 species of birds. The work is rich in new facts, is the result of a great amount of field-work, and is creditable both to the author and the State, which has called for such work. Due credit is done to Mr. S. A. Forbes, the pioneer in this line of practical biology.

THE ZOOLOGICAL RECORD FOR 1881.—*To the Editors of the AMERICAN NATURALIST*:—While thanking the editors of the *AMERICAN NATURALIST* for the appreciatory notice of the "Zoölogical Record" for 1881, contained in their April number, I wish to be permitted to offer some explanation on one or two points referring to that volume contained in the subsequent notice of the German "Zoologischer Jahresbericht" for the same year.

In the first place the number of papers recorded is no test of the contents of the Zoölogical Record. It is impossible to reduce the different recorders to a rigid standard, since the ideas of an expert in one branch as to the importance of his subject may differ from those of his fellow-workers on the value of detail; but the original aim (which I myself invariably kept in view when recording the Insecta) was, that only general and comprehensive papers and books should be noticed by their separate titles. Mere want of space was an important factor on this point; and it is obviously useless to give (*e. g.*) the full and often verbose title of a paper containing the description of one new species or variety, as well as the notice in its proper place of the subject of the paper.

Palæontological papers were also originally deemed not proper subjects for a zoölogical record, save in recent forms bearing on existing animals. There is, moreover, a separate medium for these papers in the Palæontological section of our "Geological Record." Here again, however, the individual opinions of the recorders have been allowed to have weight; and the marvelous discoveries in America have of course influenced them materially.

But it is in the notice of our record of Sponges that I particu-